550.34 (73)

SECTION V.—SEISMOLOGY.

SEISMOLOGICAL REPORTS FOR FEBRUARY, 1917.

W. J. HUMPHREYS, Professor in charge.

[Dated: Weather Bureau, Washington, D. C., April 3, 1917.]

TABLE 1.—*Noninstrumental earthquake reports, February, 1917.*

Day.	Approximate time, Greenwich Civil.	Station.	Approximate latitude.	Approximate longitude.	Intensity Rossi-Forel.	Number of shocks.	Duration.	Sounds.	Remarks.	Observer.
		CALIFORNIA.								
1917.	*H. m.*		° ′	° ′			*M. s.*			
Feb. 1	5 18	Santa Maria	34 58	120 28	4	2	10	None		R. E. Collom.
9	15 28	San Jose	37 20	121 54	3	1	2	None		U. S. Weather Bureau.
		MINNESOTA.								
6	17 46	Red Lake	47 55	95 00	4	1	1 0	Rumbling		A. C. Goddard.

TABLE 2.—*Instrumental reports, February, 1917.*

[Time used: Mean Greenwich, midnight to midnight. Nomenclature: International.]

[For significance of symbols see REVIEW for January, 1917, p. 26.]

Alaska. *Sitka. Magnetic Observatory.* U. S. Coast and Geodetic Survey. J. W. Green.

Lat. 57° 03′ 00″ N.; long., 135° 30′ 06″ W. Elevation, 15.2 meters.

Instruments: Two Bosch-Omori, 10 and 12 kg.

Instrumental constants: E: V 10, T_0 16.7; N: V 10, T_0 15.4

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917.			*H. m. s.*	*Sec.*	μ	μ	*km.*	
Feb. 20	.....	eP_N	19 47 02	10	.....	.....	.....	Preliminary phases uncertain. Times are more reliable for N-S. Drum motion on E-W appears irregular.
		eP_E	19 48 00	.....	.....	.....	.....	
		L_N	19 58 35	27	.....	.....	.....	
		L_E	19 59 28	18	.....	.....	.....	
		M_N	20 01 50	16	.....	5350	.....	
		M_E	20 02 17	14	700	.....	.....	
		C_N	20 04 25	12	.....	.....	.....	
		C_E	20 05 17	10	.....	.....	.....	
		F_E	20 46 00	.....	.....	.....	.....	
		F_N	20 51 00	.....	.....	.....	.....	

Arizona. *Tucson. Magnetic Observatory.* U. S. Coast and Geodetic Survey. F. P. Ulrich.

Lat. 32° 14′ 48″ N.; long., 110° 50′ 06″ W. Elevation, 769.6 meters.

Instruments: Two Bosch-Omori, 10 and 12 kg.

Instrumental constants: E: V 10, T_0 13.9; N: V 10, T_0 19.1

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917.			*H. m. s.*	*Sec.*	μ	μ	*km.*	
Feb. 20	.....	eP_E	19 36 10	4	.....	.....	.....	
		eP_N	19 36 13	4	.....	.....	.....	
		S_E	19 43 00	8	.....	.....	.....	
		S_N	19 43 30	8	.....	.....	.....	
		L_N	19 50 12	13	.....	.....	.....	
		L_E	19 50 20	10	.....	.....	.....	
		M_N	19 51 30	14	.....	320	.....	
		M_E	19 55 10	10	190	.....	.....	
		C_N	19 58 00	10	.....	.....	.....	
		C_E	19 59 00	8	.....	.....	.....	
		F_E	20 38 00	10	.....	.....	.....	
		F_N	20 44 00	8	.....	.....	.....	

California. *Berkeley. University of California.*

Lat., 37° 52′ 16″ N.; long., 122° 15′ 37″ W. Elevation, 85.4 meters.

(*See* Bulletin of the Seismographic Stations, University of California.)

California. *Mount Hamilton. Lick Observatory.*

Lat., 37° 20′ 24″ N.; long., 121° 38′ 34″ W. Elevation, 1,281.7 meters.

(*See* Bulletin of the Seismographic Stations, University of California.)

California. *Point Loma. Raja Yoga Academy.* F. J. Dick.

Lat., 32° 43′ 03″ N.; long., 117° 15′ 10″ W. Elevation, 91.4 meters.

Instrument: Two-component, C. D. West seismoscope.

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917.			*H. m. s.*	*Sec.*	μ	μ	*km.*	
Feb. 3	.....	.....	.....	.....	*300	*300	.....	Tremors recorded during 24 hours preceding 15h on dates given.
16	.....	.....	.....	.....	*150	*300	.....	
27	.....	.....	.....	.....	*200	*400	.....	

* Trace amplitude.

California. *Santa Clara. University of Santa Clara.* J. S. Ricard, S. J.

Lat., 37° 26′ 36″ N.; long., 121° 57′ 63″ W. Elevation, 27.43 meters.

(*See* record of the Seismographic Station, University of Santa Clara.)

TABLE 2.—*Instrumental reports, February, 1917*—Continued.

Colorado. *Denver. Sacred Heart College.* Earthquake Station. A. W Forstall, S. J.

Lat., 39° 40′ 36″ N.; long., 104° 56′ 54″ W. Elevation, 1,655 meters.

Instrument: Wiechert 80 kg., astatic, horizontal pendulum.

Instrumental constants.....

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917.			*H. m. s.*	*Sec.*	*μ*	*μ*	*km.*	
Feb. 1	.....	.....	19 39 ..	.....	.....	.....	.....	Wavelets, thickening of penmarks, especially on N-S.
		.....	19 48 ..	.....	.....	.....	.....	
1	.....	.....	23 52 ..	.....	.....	.....	.....	Small irregular waves on N-S.
		.....	23 59 ..	.....	.....	.....	.....	
2	.....	.....	1 20 ..	.....	.....	.....	.....	Recurrence of small irregular waves on N-S.
		.....	1 23 ..	.....	.....	.....	.....	
3	.....	.....	0 30 ..	.....	.....	.....	.....	Wavelets, thickening of penmarks, especially on N-S.
		.....	2 20 ..	.....	.....	.....	.....	
5	.....	.....	1 00 ..	.....	.....	.....	.....	Distinct but very irregular waves on N-S.
		.....	1 32 ..	.....	.....	.....	.....	
9-10	.....	.....	.....	.....	.....	.....	.....	Activity at intervals during day on both components.
20	III_r	P.....	19 38 ..	.....	.....	.....	.....	Good record, but S can not be identified to a certainty.
		L_N....	19 47 ..	15-20	.....	.....	.....	
		M_N....	19 47 ..	20	.....	*9050	.....	
		L_E....	19 49 ..	15-20	.....	.....	.....	
		M_E....	19 50 ..	20	*8500	.....	.....	
		C_E....	19 55 ..	.....	.....	.....	.....	
		C_N....	19 56 ..	.....	.....	.....	.....	
		F.....	20 28 ..	.....	.....	.....	.....	

* Trace amplitude.

District of Columbia. *Washington. U. S. Weather Bureau.*

Lat., 38° 54′ 12″ N.; long., 77° 03′ 03″ W. Elevation, 21 meters.

Instrument: Marvin (vertical pendulum), undamped. Mechanical registration.

Instrumental constants.. V 110 T_0 6.4

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917.			*M. m. s.*	*Sec.*	*μ*	*μ*	*km.*	
Feb. 12	.....	eL_E...	10 05 40	20	.....	.....	.....	Record does not show on N-S.
		L_E....	10 13 40	16	.....	.....	.....	
		F.....	10 30 00	.....	.....	.....	.....	
15	I_u.....	P.....	0 59 36	.....	.....	.....	7,640	
		S.....	1 08 38	.....	.....	.....	.....	
		L.....	1 16 12	14	.....	.....	.....	
		L.....	1 18 04	20	.....	.....	.....	
		L.....	1 30 24	20	.....	.....	.....	
		F.....	2 00 00	.....	.....	.....	.....	
20	III_r...	iP.....	19 34 09	.....	.....	.....	2,210	Amplitudes very large; pens went off sheet occasionally. From 19^h 40^m to 19^h 46^m amplitudes of from 4—8 cm. F merges in succeeding quake.
		S.....	19 37 50	.....	.....	.....	.....	
		L.....	{19 54 00 / 21 00 00}	14	.....	.....	.....	
		F.....	21 35 00	.....	.....	.....	.....	
20	I_r.....	P?....	20 57 45	.....	.....	.....	2,1107	Amplitude of 5μ from 21^h 4^m to 21^h 8^m. F in end of preceding quake.
		S?....	21 01 18	.....	.....	.....	.....	
		F?....	21 20 ..	.....	.....	.....	.....	

District of Columbia. *Washington. Georgetown University.* F. A. Tondorf, S. J.

Lat., 38° 54′ 25″ N.; long., 77° 04′ 24″ W. Elevation, 42.4 meters. Subsoil: Decayed diorite.

Instruments: Wiechert 200 kg. astatic horizontal pendulums, 80 kg. vertical.

Instrumental constants: {E 165 5.4 0; N 143 5.2 0; *Z 80 3.0 0*}

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917.			*H. m. s.*	*Sec.*	*μ*	*μ*	*km.*	
Feb. 15	.....	P.....	0 59 30	.....	.....	.....	.....	Microseisms present. S possibly 10-15 seconds sooner. No distinct maximum.
		S_E....	1 09 02	.....	.....	.....	.....	
		S_N....	1 09 03	.....	.....	.....	.....	
		eL.....	1 24 08	.....	.....	.....	.....	
		F.....	1 54 00	.....	.....	.....	.....	
20	.....	P_E....	19 34 15	.....	.....	.....	.....	Time markings poor because of intensity of quake; hence possible error of 2-3 seconds.
		iP_N...	19 34 17	.....	.....	.....	.....	
		S_E....	19 37 52	.....	.....	.....	.....	
		S_N....	19 38 06	.....	.....	.....	.....	
		eL.....	19 38 34	.....	.....	.....	.....	
		M_E....	19 40 22	S	*48,000	.....	.....	
		M_N....	19 40 22	7	.....	*49,000	.....	Good record with large amplitudes also obtained on Bosch-Omori machine.
		M_E....	19 41 08	13	*130,000	.....	.....	F last in second quake.
				VERTICAL.				
					A_Z			
		iP.....	*19 34 15*	.....	.....	.....	.....	
		S.....	*19 37 54*	.....	.....	.....	.....	
		eL.....	*19 38 38*	.....	.....	.....	.....	
		M.....	*19 41 21*	8	**14,000*	.....	.....	
		M.....	*19 43 00*	8	**11,000*	.....	.....	
		F?....	*20 57 00*	.....	.....	.....	.....	F in second quake.
20	.....	e_N?....	20 58 00	.....	.....	.....	.....	e and S doubtful because confused with preceding quake.
		e_E?....	20 58 06	.....	.....	.....	.....	
		S.....	21 04 07	.....	.....	.....	.....	
		eL.....	21 07 28	.....	.....	.....	.....	
		F.....	21 21 00	.....	.....	.....	.....	
				VERTICAL.				
		e.....	*20 58 33*	.....	.....	.....	.....	Phases confused with preceding quake.
		L.....	*21 07 14*	.....	.....	.....	.....	
		F.....	*21 13 00*	.....	.....	.....	.....	

* Trace amplitude.

Hawaii. *Honolulu. Magnetic Observatory.* U. S. Coast and Geodetic Survey. Frank Neumann.

Lat., 21° 19′ 12″ N.; long., 158° 03′ 48″ W. Elevation, 15.2 meters.

Instrument: Milne seismograph of the Seismological Committee of the British Association.

Instrumental constant.. T_0 18 6

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917.			*H. m. s.*	*Sec.*	*μ*	*μ*	*km.*	
Feb. 4	.....	L.....	11 06 30	.....	.....	.....	.....	
		M.....	11 08 00	.....	*100	.....	.....	
		F.....	11 19 00	.....	.....	.....	.....	
5	.....	L.....	12 49 48	.....	.....	.....	.....	
		M.....	12 56 00	.....	*200	.....	.....	
		F.....	13 10 00	.....	.....	.....	.....	
10	.....	L.....	17 28 00	.....	.....	.....	.....	
		M.....	17 29 24	.....	*100	.....	.....	
		F.....	17 31 00	.....	.....	.....	.....	

* Trace amplitude.

TABLE 2.—*Instrumental reports, February, 1917*—Continued.

Hawaii. *Honolulu. Magnetic Observatory.* U. S. Coast and Geodetic Survey—Continued.

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917.			*H. m. s.*	*Sec.*	μ	μ	*km.*	
Feb. 12		P	9 13 12					
		S	9 20 54					
		L	9 27 48	25				
		M	9 32 12		*2,300			
		C	9 34 42					
		F	11 24 00					
12		L	23 24 00					
		M	23 27 12		*200			
		F	23 32 06					
15		P	1 07 00					Tremors in end portion from 2^h 32^m to 2^h 48^m, may be a seismic tremor.
		S	1 20 48					
		L	1 33 30	25				
		M	1 38 30		*1,900			
		C	1 44 18					
		F	3 32 00					
18		L	1 44 00					
		M	1 45 18		*100			
		F	1 50 00					
18		L	1 56 12					
		M	2 04 00		*100			
		F	2 20 00					
20		L	3 32 12					
		M	3 37 54		*200			
		F	3 42 00					
20		P	19 51 30					
		L	20 04 30	30				
		M	20 17 54		*100			
		C	20 28 48					
		F	22 24 00					
21		P	10 14 00					
		L	10 26 30	24				
		M	10 31 30		*300			
		C	10 35 24					
		F	10 48 30					
21		L	14 26 18					
		M	14 30 06		*300			
		F	14 43 00					
22		P	9 36 30					
		S	9 41 00					
		L	9 56 42	24				
		M	10 01 24		*500			
		C	10 05 18					
		F	11 15 00					
25		P	5 41 24					
		L	6 00 30	21				
		M	6 03 18		*400			
		M	6 27 00		*400			
		M	6 32 42		*400			
		C	6 35 00					
		F	6 56 00					
26		L	9 20 30					
		M	9 22 48		*100			
		F	9 34 00					

* Trace amplitude.

Kansas. *Lawrence. University of Kansas.* Department of Physics and Astronomy. F. E. Kester.

Lat., 38° 57′ 30″ N.; long., 95° 14′ 58″ W. Elevation, 301.1 meters.

Instrument: Wiechert.

Instrumental constants.. { E: V 177, T_0 3.4, ϵ 4:1; N: V 205, T_0 3.4, ϵ 4:1 }

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917.			*H. m. s.*	*Sec.*	μ	μ	*km.*	
Feb. 20		P	19 35 06	4–5	1	1		Amplitude of P waves about 15 sec. later, 25 to 30 μ.
		S	19 39 32	10–12				
		L_N?	19 42 51					
		L_E?	19 43 10					
		M_N	19 44 07	10–15		133		
		M_E	19 44 12	10–15	97			
		F	21 16 00					

Maryland. *Cheltenham. Magnetic Observatory.* U. S. Coast and Geodedetic Survey. George Hartnell.

Lat., 38° 44′ 00″ N.; long., 76° 50′ 30″ W. Elevation, 71.6 meters.

Instruments: Two Bosch-Omori, 10 and 12 kg.

Instrumental constants.. { E: V 10, T_0 32; N: V 10, T_0 27 }

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917.			*H. m. s.*	*Sec.*	μ	μ	*km.*	
Feb. 15		eL_N	1 24 30	22				
		M_N	1 30 46	20		10		
		C_N	1 36 00					
20		P_N	19 34 10	3				
		P_E	19 34 14	3				
		S_N	19 37 50	4				
		S_E	19 37 53	4				
		L_E	19 40 11	18				
		eL_N	19 40 51	16				
		M_E	19 41 16	14	3,180			
		M_N	19 42 20	14		1,200		
		C_E	19 46 00	12				
		C_N	19 48 00	8				
		F_E	20 41 00	12				
		F_N	20 47 00	12				

Massachusetts. *Cambridge. Harvard University Seismographic Station,* J. B. Woodworth.

Lat., 42° 22′ 36″ N.; long., 71° 06′ 59″ W. Elevation, 5.4 meters. Foundation: Glacial sand over clay.

Instruments: Two Bosch-Omori 100 kg. horizontal pendulums (mechanical registration).

Instrumental constants.. { E: V 80, T_0 23, ϵ 0; N: V 50, T_0 25, ϵ 4:1 }

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917.			*H. m. s.*	*Sec.*	μ	μ	*km.*	
Feb. 15		*O*	*0 49 54*				6,990?	P and S do not agree well with Ottawa and Georgetown.
		eP_N	1 00 01					
		eP_E	1 00 34					
		S_E?	1 08 20					
		S_N?	1 09 29					
		eL_E?	1 17 53	22				
		eL_E	1 20 54	10				
		eL_N	1 23 21					
		eL_E	1 31 32	20				
20		O_E	*19 27 54*				2,690	N–S record preferred, as there is doubt about setting of stylus on E–W.
		O_N	*19 28 10*					
		eP_E	19 34 37					
		iP_N	19 34 53					
		S_E	19 38 57					
		S_N	19 39 15					
		eL_N	19 42 —					
		eL_E	19 43 26					

Missouri. *Saint Louis. St. Louis University.* Geophysical Observatory. J. B. Goesse, S. J.

Lat., 38° 38′ 15″ N.; long., 90° 13′ 58″ W. Elevation, 160.4 meters. Foundation: 12 feet of tough clay over limestone of Mississippi system, about 300 feet thick.

Instrument: Wiechert 80 kg. astatic, horizontal pendulum.

Instrumental constants.. V 80, T_0 7, ϵ 5:1

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917.			*H. m. s.*	*Sec.*	μ	μ	*km.*	
Feb. 20	III_r	P	19 34 42				2,400	
		S	19 38 36					
		L	19 39 36					
		F	20 57 00					

TABLE 2.—*Instrumental reports, February, 1917*—Continued.

New York. *Buffalo. Canisius College.* John A. Curtin, S. J.

Lat., 42° 53′ 02″ N.; long., 78° 52′ 40″ W. Elevation, 190.5 meters.

Instrument: Wiechert, 80 kg., horizontal.

Instrumental constants..V 80, T_0 7, ε 5:1

(Report for February, 1917, not received.)

New York. *Fordham. Fordham University.* Daniel H. Sullivan, S. J.

Lat., 40° 51′ 47″ N.; long., 73° 53′ 08″ W. Elevation, 23.9 meters.

Instrument: Wiechert, 80 kg.

Instrumental constants....E: V 72, T_0 7.2, ε 1.5:1; N: V 72, T_0 7.2, ε 3.8:1

(Report for February, 1917, not received.)

New York. *Ithaca. Cornell University.* Heinrich Ries.

Lat., 42° 26′ 58″ N.; long., 76° 29′ 09″ W. Elevation, 242.6 meters.

Instruments: Two Bosch-Omori, 25 kg., horizontal pendulums (mechanical registration).

Instrumental constants.....E: V 13, T_0 22, ε 4:1; N: V 14, T_0 25, ε 4:1

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917. Feb. 20		P	*H. m. s.* 19 35 13	*Sec.* 4	μ	μ	*km.*	
		S_E	19 39 23	8				
		S_N	19 39 24	7–14				
		M_E	19 44 12	13	*57000			E–W pen went off drum.
		M_N	19 44 12	12		*21000		
		F_E	20 13 00					
		F_N	20 20 00					

* Trace amplitude.

Panama Canal Zone. *Balboa Heights.* Isthmian Canal Commission.

Lat., 8° 57′ 39″ N.; long., 79° 33′ 29″ W. Elevation, 27.6 meters.

Instruments: Two Bosch-Omori, 100 kg.

Instrumental constants.. V 10, T_0 20

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917. Feb. 5		P_N	*H. m. s.* 6 09 14	*Sec.*	μ	μ	*km.* 233	Direction SW. or NE.
		P_E	6 09 16					
		L_N	6 09 40					
		L_E	6 09 42					
		M_E	6 09 42		400			
		M_N	6 09 50			380		
		F_N	6 14 26					
		F_E	6 14 28					
20		P_N	19 32 14				1,680	Direction unknown.
		P_E	19 32 19					
		S_E	19 34 10					
		S_N	19 35 14					
		L_E	19 36 43					
		M_E	19 37 02		4,500			
		L_N	19 37 31					
		M_N	19 37 48			3,900		
		F_E	20 15 00					
		F_N	20 18 00					
26		P	3 57 54				315	No record on N–S, clock stopped.
		L	3 58 28					
		M	3 58 30		240			
		F	4 03 06					

Porto Rico. *Vieques. Magnetic Observatory.* U. S. Coast and Geodetic Survey. F. L. Adams.

Lat., 18° 09′ N.; long., 65° 27′ W. Elevation, 19.8 meters.

Instruments: Two Bosch-Omori.

Instrumental constants..E: V 10, T_0 17.5; N: V 10, T_0 18.0

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917. Feb. 9		P	*H. m. s.* 7 15 16	*Sec.* 3	μ	μ	*km.*	Local shock, not felt.
		M	7 15 30	3	20	20		
		F_E	7 17 00					
		F_N	7 18 30					
12		e_N	20 06 28	2				
		e_E	20 06 31	2				
		M	20 06 41	2	40	30		
		F	20 10 00					
15		e	0 57 00					
		M_E	1 18 00	20	10			
		M_N	1 19 30	20		20		
		F_N	1 32 00					
		F_E	1 38 00					
20		F_E	20 32 35	7				The stylus of N–S went off the sheet at 20^h 39^m 40^s and did not free itself until 20^h 50^m 30^s. Amplitude to edge of paper, 6,500 μ.
		P_N	20 32 40	8				
		L_N	20 35 25	17				
		L_E	20 35 29	20				
		M_E	20 38 40	18	3,380			
		C_E	20 42 00	13				
		F_E	22 35 00					
		F_N	22 45 00					

Vermont. *Northfield. U. S. Weather Bureau.* Wm. A. Shaw.

Lat., 44° 10′ N.; long., 72° 41′ W. Elevation, 256 meters.

Instruments: Two Bosch-Omori, mechanical registration.

Instrumental constants: E: V 10, T_0 15; N: V 10, T_0 16

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917. Feb. 15		e?	*H. m. s.* 0 59 30	*Sec.*	μ	μ	*Km.*	
		S?	1 08 27					
		F	1 20 00					
20	II_r	P	19 35 06				2,960	
		S	19 39 46					
		L	19 43 20	20				
		M_E	19 45 00		2900			
		M_N	19 45 30			1900		
		F	21 10 00					

Canada. *Ottawa. Dominion Astronomical Observatory.* Earthquake Station. Otto Klotz.

Lat., 45° 23′ 38″ N.; long., 75° 42′ 57″ W. Elevation, 83 meters.

Instruments: Two Bosch photographic horizontal pendulums, one Spindler & Hoyer 80 kg. vertical seismograph.

Instrumental constants: V 120, T_0 26

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917. Feb. 12		e?	*H. m. s.* 9 38 20	*Sec.*	μ	μ	*km.*	Strong microseisms mask phases on N–S.
		eL_E	10 00 00	20				
		eL_N	10 05 00	20				
		L_N	10 13 00	20				
		L_E	10 17 00	18				
		F						
15		*O*	*0 48 33*				8,420	
		P	1 00 16	4				
		S_N	1 09 57					
		S_E	1 09 58					
		eL	1 22 00	30				
		L	1 26 00	30				
		L	1 32 00	20				
		L	1 37 00	17				
		L	1 50 00	15				
		F	2 15 00					

TABLE 2.—*Instrumental reports, February, 1917*—Continued.

Canada. *Ottawa. Dominion Astronomical Observatory.* Earthquake Station—Continued.

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917.			*H. m. s.*	*Sec.*	*μ*	*μ*	*km.*	
Feb. 20	.....	*O*	*19 29 31*	.....	.....	.....	2,900	
		iP	19 35 18	.....	.....	.....	.....	
		eP	19 35 22	.....	.....	.....	.....	
		S	19 39 54	.....	.....	.....	.....	
		eL	19 43 42	.....	.....	.....	.....	
		M	19 45 18	12	350	200	.....	
		L_N	20 00 00	17	.....	.....	.....	
		L	20 12 00 20 17 00	11	.....	.....	.....	
		L_N	20 26 00	12	.....	.....	.....	
		L_N	20 45 00	12	.....	.....	.....	
		F	21 30 00	.....	.....	.....	.....	

Canada. *Toronto. Dominion Meteorological Service.*

Lat., 43° 40′ 01″ N.; long., 79° 23′ 54″ W. Elevation, 113.7 meters. Subsoil: Sand and clay.

Instrument: Milne horizontal pendulum, North. In the meridian.

Instrumental constant.. T_0 18. Pillar deviation, 1 mm. swing of boom=0.50″.

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917.			*H. m. s.*	*Sec.*	*μ*	*μ*	*km.*	
Feb. 12	.....	e?	9 48 00	.....	.....	.....	.....	
		L	10 02 30	.....	.....	.....	.....	
		eL	10 08 12	.....	.....	.....	.....	
		M	10 14 54	.....	*1300	.....	.....	
		F?	10 50 30	.....	.....	.....	.....	
12	.....	L?	11 20 18	.....	*50	.....	.....	Doubtful as to being seismic.
		F	11 31 30	.....	.....	.....	.....	
14	.....	L	5 40 06	.....	*100	.....	.....	
		F?	6 02 30	.....	.....	.....	.....	
15	.....	P	0 59 36	.....	.....	.....	.....	Beginning of P not well defined.
		S	1 08 30	.....	.....	.....	.....	
		L	1 26 18	.....	.....	.....	.....	
		L	1 32 30	.....	.....	.....	.....	
		M	1 44 36	.....	*400	.....	.....	
		L	2 36 12	.....	.....	.....	.....	
		F?	3 22 00	.....	.....	.....	.....	
20	.....	P?	19 36 00	.....	.....	.....	.....	Minute P waves. Beginning very indistinct. Marked large disturbance. Possibly in West Indies of submarine origin.
		iS	19 39 24	.....	.....	.....	.....	
		iL	19 42 24	.....	.....	.....	.....	
		M	19 44 30 19 45 30	.....	*25000	.....	.....	
		iL	20 10 18	.....	.....	.....	.....	
		iL	20 22 00	.....	.....	.....	.....	
		F	21 50 00	.....	.....	.....	.....	
21	.....	e	10 01 54	.....	.....	.....	.....	Slight thickenings.
		L	10 26 54	.....	.....	.....	.....	
		L	10 45 18	.....	*50	.....	.....	
		F	10 58 48	.....	.....	.....	.....	
21	.....	L	15 10 48	.....	*100	.....	.....	Thickening.
		F	15 19 30	.....	.....	.....	.....	
22	.....	eL	9 33 54	.....	.....	.....	.....	
		L	10 06 42	.....	*200	.....	.....	
		L	10 20 00	.....	.....	.....	.....	
		F	10 53 36	.....	.....	.....	.....	
25	.....	L	6 32 00	.....	.....	.....	.....	Minute thickenings at intervals.
		L	6 51 30	.....	*50	.....	.....	
		F	7 18 42	.....	.....	.....	.....	

* Trace amplitude.

Canada. *Victoria, B. C. Dominion Meteorological Service.*

Lat., 48° 24′ N.; long., 123° 19′ W. Elevation, 67.7 meters. Subsoil: Rock.

Instrument: Wiechert, vertical; Milne horizontal pendulum, North. In the meridian.

Instrumental constant.. T_0 18. Pillar deviation, 1 mm., swing of boom=0.54″.

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917.			*H. m. s.*	*Sec.*	*μ*	*μ*	*km.*	
Feb. 12	.....	P	9 27 39	.....	.....	.....	3,470	
		S	9 32 54	.....	.....	.....	.....	
		L	9 38 03	.....	.....	.....	.....	
		M	9 54 55	.....	*500	.....	.....	
		F	10 18 17	.....	.....	.....	.....	
14	.....	M	5 39 10	.....	*50	.....	.....	
15	.....	P?	1 12 55	.....	.....	.....	.....	
		S?	1 18 22	.....	.....	.....	.....	
		L	1 25 39	.....	.....	.....	.....	
		M	1 49 11	.....	*1,500	.....	.....	
		F	2 54 34	.....	.....	.....	.....	

* Trace amplitude.

Canada. *Victoria, B. C. Dominion Meteorological Service*—Continued.

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917.			*H. m. s.*		*μ*	*μ*	*km.*	
			VERTICAL.					
					A_Z			
Feb. 15		*M*	*1 40 —*	*15*	*†6*	.....	.....	
20	.....	P?	19 36 57	.....	.....	.....	.....	
		iP	19 40 25	.....	.....	.....	.....	
		S	19 45 23	.....	.....	.....	.....	
		iS	19 48 51	.....	.....	.....	.....	
		iL	19 56 03	.....	.....	.....	.....	
		L	19 58 51	.....	.....	.....	.....	
		M	20 02 44	.....	*3000	.....	.....	
		L	20 16 03	.....	.....	.....	.....	
		F	21 08 41	.....	.....	.....	.....	
			VERTICAL.					
					A_Z			
		P?	*19 37 40*	*6*	.....	.....	.....	
		S?	*19 41 00*	*6*	.....	.....	.....	
		L	*19 45 40*	*10–12*	.....	.....	.....	
		M	*20 02 40*	*10*	*†47*	.....	.....	
21	.....	L	10 29 28	.....	.....	.....	.....	Probably part of long-distance quake.
		M	10 33 31	.....	*400	.....	.....	
		F?	10 37 29	.....	.....	.....	.....	
21	.....	M	14 53 21	.....	*200	.....	.....	
22	.....	L	9 59 23	.....	.....	.....	.....	
		M	10 03 51	.....	*300	.....	.....	
		F	10 15 15	.....	.....	.....	.....	
25	.....	P?	6 42 16	.....	.....	.....	.....	
		L	6 45 44	.....	.....	.....	.....	
		M	6 47 43	.....	*200	.....	.....	
		F	6 56 38	.....	.....	.....	.....	

* Trace amplitude. † True earth movement.

TABLE 3.—*Late seismological reports.* (*Instrumental.*)

Kansas. *Lawrence. University of Kansas.* Department of Physics and Astronomy. F. E. Kester.

Lat., 38° 57′ 30″ N.; long., 95° 14′ 58″ W. Elevation, 301.1 meters.

Instrument: Wiechert.

Instrumental constants.. E: V 177, T_0 3.4, ϵ 4:1; N: V 205, T_0 3.4, ϵ 4:1

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1916.			*H. m. s.*	*Sec.*	*μ*	*μ*	*km.*	
Nov. 21	.....	P_E	6 30 46	1–2	.....	.....	.....	N–S component out of order.
		S_E	6 34 58	2–15	.....	.....	.....	
		L_E	6 39 07	.....	.....	.....	.....	
		M_E	6 43 29	6–8	1	.....	.....	
		F	7 50 00	.....	.....	.....	.....	

(No record in December, 1916.)

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917.								
Jan. 30	.....	P_E	2 56 13	.....	.....	.....	.....	
		P_E	2 56 23	.....	.....	.....	.....	
		P_N	2 56 24	.....	.....	.....	.....	
		S_N	3 04 50	.....	.....	.....	.....	
		S_E	3 04 52	.....	.....	.....	.....	
		L_E	3 13 33	20–40	.....	.....	.....	
		L_N	3 14 22	20–40	.....	.....	.....	
		M_E	3 21 39	20	66	.....	.....	
		M_N	3 22 07	20	.....	20	.....	
		F	5 37 00	.....	.....	.....	.....	

SEISMOLOGICAL DISPATCHES.[1]

Murcia, Spain. (*Belated dispatch.*)

An earth movement in an east-west direction, which lasted for 3 seconds, was felt on January 28 at $22^h\ 35^m$, G. M. T., in this city and neighborhood. Great alarm was occasioned. (Special dispatch.)

Honolulu, H. I. February 24, 1917.

Intense activity, greater than known heretofore to any Hawaiians now living, is manifest in Kilauea volcano. (United Press.)

[1] Reported by the organization indicated and collected by the seismological station at Georgetown University, Washington, D. C.